

## **Dicotyledon Weed Quantification Algorithm for Selective Herbicide Application in Maize Crops: Statistical Evaluation of the Potential Herbicide Savings**

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**Abstract :** This work contributes a statistical model and simulation framework yielding the best estimate possible for the potential herbicide reduction when using the MoDiCoVi algorithm all the while requiring a efficacy comparable to conventional spraying. In June 2013 a maize field located in Denmark were seeded. The field was divided into parcels which was assigned to one of two main groups: 1) Control, consisting of subgroups of no spray and full dose spraty; 2) MoDiCoVi algorithm subdivided into five different leaf cover thresholds for spray activation. In addition approximately 25% of the parcels were seeded with additional weeds perpendicular to the maize rows. In total 299 parcels were randomly assigned with the 28 different treatment combinations. In the statistical analysis, bootstrapping was used for balancing the number of replicates. The achieved potential herbicide savings was found to be 70% to 95% depending on the initial weed coverage. However additional field trials covering more seasons and locations are needed to verify the generalisation of these results. There is a potential for further herbicide savings as the time interval between the first and second spraying session was not long enough for the weeds to turn yellow, instead they only stagnated in growth.

**Keywords :** herbicide reduction, macrosprayer, weed crop discrimination, site-specific, sprayer boom

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